

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 10-078931

(43)Date of publication of application : 24.03.1998

(51)Int.Cl.

G06F 13/00  
G06F 13/00  
G06F 9/46  
H04N 7/173

(21)Application number : 08-233024

(71)Applicant : TOSHIBA CORP

(22)Date of filing : 03.09.1996

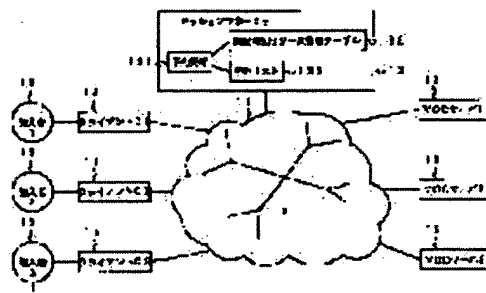
(72)Inventor : TAKAHASHI KATSUMI

## (54) RESOURCE MANAGEMENT METHOD AND INFORMATION SERVICE SYSTEM

(57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a video on-demand(VOD)/information on-demand(IDD) system which can assure the reception of services for subscribers even in a congestion state of a network.

**SOLUTION:** A session manager 13 which manages the resources has a function to reserve the sessions and services, and a subscriber can reserve a session and service. When plural clients 14 have the same or similar reservations, the manager 13 replaces these reservations with the broadcasting services which use the common resources. Thus, it's possible to effectively use the network and server resources and to offer the services to other subscribers by means of the idle resources.



## LEGAL STATUS

[Date of request for examination] 08.09.2000

[Date of sending the examiner's decision of rejection] 09.12.2003

[Kind of final disposal of application other than

the examiner's decision of rejection or  
application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's  
decision of rejection]

[Date of requesting appeal against examiner's  
decision of rejection]

[Date of extinction of right]

Copyright (C); 1998,2003 Japan Patent Office

CLAIMS

---

[Claim(s)]

[Claim 1] The information which has the client and server by which network connection was carried out, and was demanded from the client It is the resource-management approach in the information service system with which a client is provided from a server. When the connection reservation demand from each client is received, the utilization schedule of a network resource is managed based on the received connection reservation demand and a new connection reservation demand is published, The resource-management approach which judges whether registration of the connection reservation demand is possible, and is characterized by enabling it to guarantee connection with a server to the connection reservation demand which received based on the utilization situation of said network resource in the time zone specified by the connection reservation demand.

[Claim 2] The information which has the client and server by which network connection was carried out, and was demanded from the client It is the resource-management approach in the information service system with which a client is provided from a server. When the service reservation demand from each client is received, the utilization schedule of a server resource is managed based on the received service reservation demand and a new service reservation demand is published, The resource-management approach which judges whether registration of the service reservation demand is possible, and is carried out [ having enabled it to guarantee offer of service to the service reservation demand which received, and ] as the description based on the utilization situation of said server resource in the time zone specified by the service reservation demand.

[Claim 3] The information which has the client and server by which network connection was carried out, and was demanded from the client It is the resource-management approach in the information service system with which a client is provided from a server. The identitas which received the service reservation demand from each client, and was reserved from two or more clients, or a similar service request The resource-management approach characterized by permuting by one multiple address service which shares a network resource and a server resource, and enabling it to process said two or more reserved service requests by multiple address service.

[Claim 4] In the information service system which provides a client with the information which has the client and server by which network connection was carried out, and was demanded from the client from a server When a new connection reservation demand is published with the network-resource management tool which manages the utilization schedule of a network resource based on the connection reservation demand from each client, A means to judge whether registration of the connection reservation demand is possible based on the utilization situation of said network resource in the time zone specified by the connection reservation demand is provided. The information service system characterized by being constituted so that connection with a server can be guaranteed to the received connection reservation demand.

[Claim 5] In the information service system which provides a client with the information which has the client and server by which network connection was carried out, and was demanded from the client from a server When a new service reservation demand is published with the server resource management tool which manages the utilization schedule of a server resource based on the service reservation demand from each client, A means to judge whether registration of the service reservation demand is possible based on the utilization situation of said server resource in the time zone specified by the service reservation demand is provided. The information service system characterized by being constituted so that offer of service can be guaranteed to the received service reservation demand.

[Claim 6] Two or more same or information service systems characterized by to provide a means permute a similar service request by one multiple address service which shares a network resource and a server resource from a client received with a service reservation receptionist means receive the service reservation demand from each client, and this service reservation receptionist means, in the information service system which provides a client with the information which has the client and the server by which network connection was carried out, and was demanded from the client from a server.



## DETAILED DESCRIPTION

---

### [Detailed Description of the Invention]

[0001]

[Field of the Invention] Especially this invention relates to the information service system with which the resource-management approach of a network resource or a server resource and this management method in VOD (video on demand) / IOD (information on demand) system are applied about the resource-management approach and an information service system.

[0002]

[Description of the Prior Art] In recent years, development of the application using these is briskly performed by development of video, the digital coding technique of an audio, and a broadband network technique. Especially, VOD (video on demand) / IOD (information on demand) system attracts attention as interactive service which provides a client with video or other various information from a server according to the demand from a client.

[0003] In these VOD/IOD system, resource-management functions called a session manager, such as a network, are usually used. Although, as for a session manager's function, normalization is advanced with a protocol called DSM-CC (Digital Storage Media Command & Control:ISO/IEC 13818-6) to which the current standardization activity is advanced, the basic function is as follows.

[0004] That is, if the session manager has managed the utilization situation of a network resource and the session (connection) demand from a client is received, he will investigate empty situations, such as a network resource at that time. If there is an opening, a session will be set up, a server will be connected with a client, but when there is no opening, a session is not set up but an error is notified to a client.

[0005] Usually, since the network resource is shared by two or more clients, in a crowded time zone, session setting out is not performed but the situation where service of VOD/IOD cannot be received generates a subscriber frequently.

[0006] Moreover, since the throughput is limited not only about a network resource but a server, there is a limitation in the number of services which can be offered simultaneously. Not only a network resource but when there is no opening in a server resource (throughput), it becomes impossible for this reason, for a subscriber to receive service of VOD/IOD.

[0007]

[Problem(s) to be Solved by the Invention] As mentioned above, since two or more subscribers were sharing resources, such as a network, in the conventional VOD/IOD system, in the crowded time zone, the subscriber might be unable to receive service. Moreover, while a limitation has a server also in the number of services which can be offered simultaneously and service requests are occurring frequently, there is a problem that a new service request is no longer received.

[0008] As this invention was made in view of such a point and can reserve the connection to a server in advance, it aims at offering the resource-management approach which can give the guarantee which receives service to a subscriber also in the time of network rush hours, and an information service system.

[0009] Moreover, this invention is summarized considering the service to two or more subscribers' of each reservation as multiple address service, and aims at offering the resource-management approach and information service system which can aim at a deployment of a network resource or a server resource.

[0010]

[Means for Solving the Problem] This invention has the client and server by which network connection was carried out. It is the resource-management approach in the information service system which provides a client with the information demanded from the client from a server. When the connection reservation demand from each client is received, the utilization schedule of a network resource is managed based on the received connection reservation demand and a new connection reservation demand is published. Based on the utilization situation of said network resource in the time zone specified by the connection reservation demand, it judges whether registration of the connection

reservation demand is possible, and carries out [ having enabled it to guarantee the connection for the communication link with a server, and ] as the description to the connection reservation demand which received.

[0011] In addition to the usual network-resource function manager realized by the session manager etc., for example, the function of reservation is added in this resource-management approach. This reservation function is for receiving the reservation about connection with the server by setting out of a session beforehand from a subscriber, not only based on a current situation but based on the connection reservation demand from each client, the utilization situation of a network resource makes time amount a parameter, and schedule management is carried out. Thus, when a new connection reservation demand is published from a client by managing the utilization schedule of a network resource, it can distinguish whether registration of the connection reservation demand is possible by investigating the utilization situation of the network resource in the time zone specified by the connection reservation demand. Thereby, a subscriber can get the guarantee which receives service by making connection with beforehand.

[0012] Moreover, a subscriber becomes possible [ reserving the service itself demanded in advance ] by replacing not only with a network resource but with it, or managing the utilization schedule of a server resource in addition to it.

[0013] Moreover, this invention has the client and server by which network connection was carried out. It is the resource-management approach in the information service system which provides a client with the information demanded from the client from a server. The identitas which received the service reservation demand from each client, and was reserved from two or more clients, or a similar service request It permutes by one multiple address service which shares a network resource and a server resource, and is characterized by enabling it to process said two or more reserved service requests by multiple address service.

[0014] According to this resource-management approach, the same or when similar service is reserved, those services are transposed to service of a multiple address mold by two or more subscribers. It becomes possible for this to offer service to two or more subscribers using the same network resource and a server resource. Therefore, the resource which could aim at the deployment of a resource and was able to do the opening by this is utilizable for another service provision.

[0015]

[Embodiment of the Invention] Hereafter, the operation gestalt of this invention is explained with reference to a drawing. The VOD system concerning 1 operation gestalt of this invention is shown in drawing 1 . This VOD system offers information transfer service of an animation etc. interactively by sending the demand according to actuation by the subscriber 15 to the VOD server 12 from a client 14 through a network 11.

[0016] A network 11 is for realizing signal transduction in this VOD system, and has the resources (bandwidth etc.) of finite. Each VOD server 12 is for offering the service demanded by the client 14. Since those resources (throughput etc.) that it has are limited, each server 12 has a limitation in the capacity to serve. For example, it is that the number of clients which can be served is specified simultaneously etc.

[0017] The session manager 13 managed the resource of a network 11, or the resource of a network 11 and each server 12, and has achieved the duty which receives the demand of the session (connection) from a client 14 or a session, and service. namely, the session manager 13 -- a network 11 and a server 12 -- when each resource is managed and the demand of the session / service initiation from a client 14 responds, a resource required for them is secured and advice of the propriety of a session / service initiation is returned to a client 14. A client 14 is a device by which subscribers 15 are terminals, such as a set top box which carries out a direct control, and receive service.

[0018] In this operation gestalt, the session manager 13 has further the reservation function and the multiple address service replace function which transposes the service request from two or more clients reserved by the reservation function to multiple address service, and processes it.

[0019] (Reservation function) A reservation function is for receiving connection with the server by

setting out of a session, and the reservation about service beforehand from a subscriber. When a subscriber 15 does reservation of a session or service through a client 14, reservation is approved by conversation of a client 14 and the session manager 13. The session manager 13 may talk with a server 12 in the middle of this conversation. Reservation is approved when the session manager 13 judges that the session specified by each client 14 or service can provide in the specified time zone. If reservation is approved, the detailed information on reservation will be memorized in the session manager 13, and advice of reservation formation will be sent to a client 14.

[0020] (Multiple address service replace function) This function is the same or the function to permute those reserved services by one certain common service according to conditions when reservation of similar service is approved from two or more clients 14. Common service is service of a multiple address mold like broadcast. As conditions, it is more than the number of reservation with fixed same contents, almost same time, and them, for example. By permuting by such multiple address mold service, the server resource and network which are occupied by the service for every client are communalized, it becomes economization of a resource, it becomes possible to use for other services the resource which was able to do the opening by this, and many subscribers can receive service now.

[0021] For implementation of the above reservation function and a multiple address service replace function, the reservation receptionist processing section 131, the resource management table 132 classified by time zone, and the reservation list 133 are prepared for the session manager 13.

[0022] The reservation receptionist processing section 131 performs the resource management using the resource management table 132 classified by time zone, and reservation management using a reservation list 133. In the resource management using the resource management table 132 classified by time zone, not only the utilization situation of a current resource but the utilization schedule of a resource over the future is managed. This utilization schedule is managed considering time amount as a parameter based on the situation of session reservation / service reservation from each client 14. An example of the resource management table 132 classified by time zone is shown in drawing 2.

[0023] In drawing 2 the resource management table 132 classified by time zone Resource management table 132a which manages the utilization situation of each network resource (a resource 1, a resource 2, a resource 3, resource 4) in the time zone from time amount T1 to T2, Resource management table 132b which manages the utilization situation of each network resource (a resource 1, a resource 2, a resource 3, resource 4) in the time zone from time amount T2 to T3, And it consists of resource management table 132c which manages the utilization situation of each network resource (a resource 1, a resource 2, a resource 3, resource 4) in the time zone from time amount T3 to T four. In each [ these ] table, the amount of resources and the amount of empty resources are managed the usable total capacity and during an activity about each network resource. Here, the amount of resources is the amount of resources which setting out of the session when reservation is already approved takes during an activity. Thus, by managing the utilization schedule of a network resource and a server resource by making time amount into a parameter, it becomes possible to investigate the empty situation of the network resource in the time zone specified by session reservation / service reservation, and a server resource, and this can perform the propriety judging of reservation.

[0024] Moreover, as shown in drawing 3, the operating condition (under an activity, opening) of the resource in a time zone and its time zone may be managed to each network resource (a resource 1, a resource 2, a resource 3, a resource 4, --) of every.

[0025] The resource-management table with the structure of drawing 2 or drawing 3 is similarly built not only about a network resource but about a server resource. Session reservation / service reservation which carried out reservation formation is registered into the reservation list 133 of drawing 1. An example of this reservation list 133 is shown in drawing 4. In a reservation list 133, the service ID for specifying the class of service required for operation of the server ID to be used, Client ID, a session or the start time of service, end time, and the content of reservation which was resource-name-listed and was reserved for every reservation etc. is registered as shown in drawing 4. It re-registers with the reservation list for the multiple addresses of drawing 5 R> 5 about reservation of that service start time, end time, and the content of service are the same among the reservation registered into the reservation

list 133 registered into drawing 4 , or resemblance. The service ID for specifying the class of service required for operation of two or more clients ID which receive the server ID to be used and multiple address service, a session and the start time of service, end time, and the content of reservation which was resource-name-listed and was reserved for every multiple address service etc. is registered into this reservation list for the multiple addresses.

[0026] Next, with reference to the flow chart of drawing 6 , the reservation receptionist procedure by the session manager's 13 reservation receptionist processing section 131 is explained. If a new reservation demand occurs from a client 14 (step S11), the reservation receptionist processing section 131 will investigate [ the same or ] whether reservation of a similar content is already registered about time amount, contents, etc. with reference to a reservation list 133 (steps S12 and S13). A same or reservation demand new when reservation of a similar content is not registered is treated as reservation which should be unprocessed, and a same or reservation demand new when reservation of a similar content is already registered is treated as reservation which should be carried out multiple address processing together with other demands (steps S14 and S15).

[0027] Then, it is investigated when the idle status of the resource in the time zone specified by the reservation which should be unprocessed, and which should be carried out reservation or multiple address processing refers to the resource management table 132 classified by time zone, and it is judged whether a resource required for session setting out and service provision is securable (step S16).

[0028] When a resource required for session setting out and service provision can be secured, while the reservation is registered into a reservation list 133, reservation formation is notified to the corresponding client 14 (step S17), and when a resource can be secured and there is nothing, it is notified to the client 14 to which the failure of reservation corresponds (step S18).

[0029] Next, the command sequence performed at the reserved session or the start time of service is explained. First, with reference to drawing 7 , the case where a command sequence is started by the session manager 13 is explained.

[0030] If the session manager 13 becomes the reserved session or the start time of service, he will publish session establishment directions (Session Set Up Indication) to the server 12 and client 14 which correspond based on the content of reservation, respectively, and will set up a link required for the communication link with a server 12 and a client 14 between them. When the response (Response) to session establishment directions is not returned, issuance processing of session establishment directions is retried several times. If a client 14 is connected with a server 12 by session establishment, direct communication will be performed between a client 14 and a server 12 henceforth, and the image transfer to a client 12 from the server 12 which answered the service request to a server 12 and its demand from the client 14 etc. will be performed.

[0031] Next, with reference to drawing 8 , actuation in case a command sequence is started from a client is explained. If a client 14 becomes the reserved session or the start time of service, it will publish a session establishment demand (SessionSet Up Request) to the session manager 13. The session manager 13 publishes session establishment directions (SessionSet Up Indication) to a server 12 according to the content of reservation, and sets up a link required for the communication link with a server 12 and a client 14. Then, the session manager 13 notifies a session establishment condition to a client 12, and makes that content of establishment check (Session Set Up Confirm). If a client 14 is connected with a server 12 by session establishment, direct communication will be performed between a client 14 and a server 12 henceforth, and the image transfer to a client 12 from the server 12 which answered the service request to a server 12 and its demand from the client 14 etc. will be performed.

[0032] Next, with reference to drawing 9 thru/or drawing 12 , the example of a multiple address service replace function is explained. For example, the clients C1, C2, and C3 of drawing 1 R> 1 shall carry out the next reservation, respectively.

[0033]

C months [ 1:1 ] 10 21:00 - 23:00 Film A -- Service S1 C months [ 2:1 ] 10 21:10 - 23:10 Film A -- Service S2 C months [ 3:1 ] 10 21:10 - 23:10 Film A -- When the service S3 session manager 1 manages reservation of these services, a managed table as shown in drawing 9 is used as the above-mentioned



resource management table 132. The resource which time of day takes the axis of abscissa of drawing 9 R> 9 to, and service takes an axis of ordinate is expressed. Since there are a network resource and a server resource, two or more managed tables are needed for a resource.

[0034] Drawing 10 illustrates the resource utilization situation of a time zone that each service when service is offered as reservation is offered simultaneously. In this condition, it turns out that three services S1, S2, and S3 occupy the separate resource so that clearly from this drawing 10.

[0035] Then, before service is started, the session manager 13 transposes these three services S1, S2, and S3 to one service S4 of a multiple address mold. The replaced service uses a common resource. Drawing 11 is the resource management table after being replaced. As compared with drawing 9, occupancy resources decrease in number, the cost per one client is reduced, and it turns out that it became available in other services about the vacant resource.

[0036] Drawing 12 shows the utilization situation of the resource under service. It turns out that the network resource and the server resource are saved as compared with drawing 10. By replacement of such service, when modification arises by the content of service, before replacing, it is necessary to take comprehension of a client. It is desirable in processing issuing advice of a service permutation to each client, and permuting only the client according to a permutation etc., after it sets up the fluctuation time zone in the phase which obtains comprehension of a client or reserves service or the session manager 13 sets up common service, before replacing since the time of day of service S1 is changed in the above-mentioned example.

[0037] In addition, in the above explanation, although the VOD service system was taken for the example, the reservation function and multiple address service replace function of this operation gestalt are applicable not only to an image call forwarding service but other various information service systems. Moreover, although the case where the session manager 13 also managed a server resource was explained, the session manager 13 may manage only a network resource and a server 12 may manage a server resource here.

[0038]

[Effect of the Invention] As explained above, according to this invention, a subscriber can get the guarantee which receives service in advance by having given the session manager the function of reservation. Moreover, while the cost per one client is reduced by transposing similar service to service of a multiple address mold, it becomes others available about the same or the resource which was vacant with this, and many subscribers can receive service.

---

**TECHNICAL FIELD**

---

[Field of the Invention] Especially this invention relates to the information service system with which the resource-management approach of a network resource or a server resource and this management method in VOD (video on demand) / IOD (information on demand) system are applied about the resource-management approach and an information service system.

---

PRIOR ART

---

[Description of the Prior Art] In recent years, development of the application using these is briskly performed by development of video, the digital coding technique of an audio, and a broadband network technique. Especially, VOD (video on demand) / IOD (information on demand) system attracts attention as interactive service which provides a client with video or other various information from a server according to the demand from a client.

[0003] In these VOD/IOD system, resource-management functions called a session manager, such as a network, are usually used. Although, as for a session manager's function, normalization is advanced with a protocol called DSM-CC (Digital Storage Media Command & Control:ISO/IEC 13818-6) to which the current standardization activity is advanced, the basic function is as follows.

[0004] That is, if the session manager has managed the utilization situation of a network resource and the session (connection) demand from a client is received, he will investigate empty situations, such as a network resource at that time. If there is an opening, a session will be set up, a server will be connected with a client, but when there is no opening, a session is not set up but an error is notified to a client.

[0005] Usually, since the network resource is shared by two or more clients, in a crowded time zone, session setting out is not performed but the situation where service of VOD/IOD cannot be received generates a subscriber frequently.

[0006] Moreover, since the throughput is limited not only about a network resource but a server, there is a limitation in the number of services which can be offered simultaneously. Not only a network resource but when there is no opening in a server resource (throughput), it becomes impossible for this reason, for a subscriber to receive service of VOD/IOD.

---

**EFFECT OF THE INVENTION**

---

[Effect of the Invention] As explained above, according to this invention, a subscriber can get the guarantee which receives service in advance by having given the session manager the function of reservation. Moreover, while the cost per one client is reduced by transposing similar service to service of a multiple address mold, it becomes others available about the same or the resource which was vacant with this, and many subscribers can receive service.

## TECHNICAL PROBLEM

---

[Problem(s) to be Solved by the Invention] As mentioned above, since two or more subscribers were sharing resources, such as a network, in the conventional VOD/IOD system; in the crowded time zone, the subscriber might be unable to receive service. Moreover, while a limitation has a server also in the number of services which can be offered simultaneously and service requests are occurring frequently, there is a problem that a new service request is no longer received.

[0008] As this invention was made in view of such a point and can reserve the connection to a server in advance, it aims at offering the resource-management approach which can give the guarantee which receives service to a subscriber also in the time of network rush hours, and an information service system.

[0009] Moreover, this invention is summarized considering the service to two or more subscribers' of each reservation as multiple address service, and aims at offering the resource-management approach and information service system which can aim at a deployment of a network resource or a server resource.

## MEANS

[Means for Solving the Problem] This invention has the client and server by which network connection was carried out. It is the resource-management approach in the information service system which provides a client with the information demanded from the client from a server. When the connection reservation demand from each client is received, the utilization schedule of a network resource is managed based on the received connection reservation demand and a new connection reservation demand is published. Based on the utilization situation of said network resource in the time zone specified by the connection reservation demand, it judges whether registration of the connection reservation demand is possible, and carries out [ having enabled it to guarantee the connection for the communication link with a server, and ] as the description to the connection reservation demand which received.

[0011] In addition to the usual network-resource function manager realized by the session manager etc., for example, the function of reservation is added in this resource-management approach. This reservation function is for receiving the reservation about connection with the server by setting out of a session beforehand from a subscriber, not only based on a current situation but based on the connection reservation demand from each client, the utilization situation of a network resource makes time amount a parameter, and schedule management is carried out. Thus, when a new connection reservation demand is published from a client by managing the utilization schedule of a network resource, it can distinguish whether registration of the connection reservation demand is possible by investigating the utilization situation of the network resource in the time zone specified by the connection reservation demand. Thereby, a subscriber can get the guarantee which receives service by making connection with beforehand.

[0012] Moreover, a subscriber becomes possible [ reserving the service itself demanded in advance ] by replacing not only with a network resource but with it, or managing the utilization schedule of a server resource in addition to it.

[0013] Moreover, this invention has the client and server by which network connection was carried out. It is the resource-management approach in the information service system which provides a client with the information demanded from the client from a server. The identitas which received the service reservation demand from each client, and was reserved from two or more clients, or a similar service request It permutes by one multiple address service which shares a network resource and a server resource, and is characterized by enabling it to process said two or more reserved service requests by multiple address service.

[0014] According to this resource-management approach, the same or when similar service is reserved, those services are transposed to service of a multiple address mold by two or more subscribers. It becomes possible for this to offer service to two or more subscribers using the same network resource and a server resource. Therefore, the resource which could aim at the deployment of a resource and was able to do the opening by this is utilizable for another service provision.

[0015]

[Embodiment of the Invention] Hereafter, the operation gestalt of this invention is explained with reference to a drawing. The VOD system concerning 1 operation gestalt of this invention is shown in drawing 1 . This VOD system offers information transfer service of an animation etc. interactively by sending the demand according to actuation by the subscriber 15 to the VOD server 12 from a client 14 through a network 11.

[0016] A network 11 is for realizing signal transduction in this VOD system, and has the resources (bandwidth etc.) of finite. Each VOD server 12 is for offering the service demanded by the client 14. Since those resources (throughput etc.) that it has are limited, each server 12 has a limitation in the capacity to serve. For example, it is that the number of clients which can be served is specified simultaneously etc.

[0017] The session manager 13 managed the resource of a network 11, or the resource of a network 11 and each server 12, and has achieved the duty which receives the demand of the session (connection)

from a client 14 or a session, and service. namely, the session manager 13 -- a network 11 and a server 12 -- when each resource is managed and the demand of the session / service initiation from a client 14 responds, a resource required for them is secured and advice of the propriety of a session / service initiation is returned to a client 14. A client 14 is a device by which subscribers 15 are terminals, such as a set top box which carries out a direct control, and receive service.

[0018] In this operation gestalt, the session manager 13 has further the reservation function and the multiple address service replace function which transposes the service request from two or more clients reserved by the reservation function to multiple address service, and processes it.

[0019] (Reservation function) A reservation function is for receiving connection with the server by setting out of a session, and the reservation about service beforehand from a subscriber. When a subscriber 15 does reservation of a session or service through a client 14, reservation is approved by conversation of a client 14 and the session manager 13. The session manager 13 may talk with a server 12 in the middle of this conversation. Reservation is approved when the session manager 13 judges that the session specified by each client 14 or service can provide in the specified time zone. If reservation is approved, the detailed information on reservation will be memorized in the session manager 13, and advice of reservation formation will be sent to a client 14.

[0020] (Multiple address service replace function) This function is the same or the function to permute those reserved services by one certain common service according to conditions when reservation of similar service is approved from two or more clients 14. Common service is service of a multiple address mold like broadcast. As conditions, it is more than the number of reservation with fixed same contents, almost same time, and them, for example. By permuting by such multiple address mold service, the server resource and network which are occupied by the service for every client are communalized, it becomes economization of a resource, it becomes possible to use for other services the resource which was able to do the opening by this, and many subscribers can receive service now.

[0021] For implementation of the above reservation function and a multiple address service replace function, the reservation receptionist processing section 131, the resource management table 132 classified by time zone, and the reservation list 133 are prepared for the session manager 13.

[0022] The reservation receptionist processing section 131 performs the resource management using the resource management table 132 classified by time zone, and reservation management using a reservation list 133. In the resource management using the resource management table 132 classified by time zone, not only the utilization situation of a current resource but the utilization schedule of a resource over the future is managed. This utilization schedule is managed considering time amount as a parameter based on the situation of session reservation / service reservation from each client 14. An example of the resource management table 132 classified by time zone is shown in drawing 2.

[0023] In drawing 2 the resource management table 132 classified by time zone Resource management table 132a which manages the utilization situation of each network resource (a resource 1, a resource 2, a resource 3, resource 4) in the time zone from time amount T1 to T2, Resource management table 132b which manages the utilization situation of each network resource (a resource 1, a resource 2, a resource 3, resource 4) in the time zone from time amount T2 to T3, And it consists of resource management table 132c which manages the utilization situation of each network resource (a resource 1, a resource 2, a resource 3, resource 4) in the time zone from time amount T3 to T four. In each [ these ] table, the amount of resources and the amount of empty resources are managed the usable total capacity and during an activity about each network resource. Here, the amount of resources is the amount of resources which setting out of the session when reservation is already approved takes during an activity. Thus, by managing the utilization schedule of a network resource and a server resource by making time amount into a parameter, it becomes possible to investigate the empty situation of the network resource in the time zone specified by session reservation / service reservation, and a server resource, and this can perform the propriety judging of reservation.

[0024] Moreover, as shown in drawing 3, the operating condition (under an activity, opening) of the resource in a time zone and its time zone may be managed to each network resource (a resource 1, a resource 2, a resource 3, a resource 4, --) of every.

[0025] The resource-management table with the structure of drawing 2 or drawing 3 is similarly built not only about a network resource but about a server resource. Session reservation / service reservation which carried out reservation formation is registered into the reservation list 133 of drawing 1. An example of this reservation list 133 is shown in drawing 4. In a reservation list 133, the service ID for specifying the class of service required for operation of the server ID to be used, Client ID, a session or the start time of service, end time, and the content of reservation which was resource-name-listed and was reserved for every reservation etc. is registered as shown in drawing 4. It re-registers with the reservation list for the multiple addresses of drawing 5 R> 5 about reservation of that service start time, end time, and the content of service are the same among the reservation registered into the reservation list 133 registered into drawing 4, or resemblance. The service ID for specifying the class of service required for operation of two or more clients ID which receive the server ID to be used and multiple address service, a session and the start time of service, end time, and the content of reservation which was resource-name-listed and was reserved for every multiple address service etc. is registered into this reservation list for the multiple addresses.

[0026] Next, with reference to the flow chart of drawing 6, the reservation receptionist procedure by the session manager's 13 reservation receptionist processing section 131 is explained. If a new reservation demand occurs from a client 14 (step S11), the reservation receptionist processing section 131 will investigate [ the same or ] whether reservation of a similar content is already registered about time amount, contents, etc. with reference to a reservation list 133 (steps S12 and S13). A same or reservation demand new when reservation of a similar content is not registered is treated as reservation which should be unprocessed, and a same or reservation demand new when reservation of a similar content is already registered is treated as reservation which should be carried out multiple address processing together with other demands (steps S14 and S15).

[0027] Then, it is investigated when the idle status of the resource in the time zone specified by the reservation which should be unprocessed, and which should be carried out reservation or multiple address processing refers to the resource management table 132 classified by time zone, and it is judged whether a resource required for session setting out and service provision is securable (step S16).

[0028] When a resource required for session setting out and service provision can be secured, while the reservation is registered into a reservation list 133, reservation formation is notified to the corresponding client 14 (step S17), and when a resource can be secured and there is nothing, it is notified to the client 14 to which the failure of reservation corresponds (step S18).

[0029] Next, the command sequence performed at the reserved session or the start time of service is explained. First, with reference to drawing 7, the case where a command sequence is started by the session manager 13 is explained.

[0030] If the session manager 13 becomes the reserved session or the start time of service, he will publish session establishment directions (Session Set Up Indication) to the server 12 and client 14 which correspond based on the content of reservation, respectively, and will set up a link required for the communication link with a server 12 and a client 14 between them. When the response (Response) to session establishment directions is not returned, issuance processing of session establishment directions is retried several times. If a client 14 is connected with a server 12 by session establishment, direct communication will be performed between a client 14 and a server 12 henceforth, and the image transfer to a client 12 from the server 12 which answered the service request to a server 12 and its demand from the client 14 etc. will be performed.

[0031] Next, with reference to drawing 8, actuation in case a command sequence is started from a client is explained. If a client 14 becomes the reserved session or the start time of service, it will publish a session establishment demand (SessionSet Up Request) to the session manager 13. The session manager 13 publishes session establishment directions (SessionSet Up Indication) to a server 12 according to the content of reservation, and sets up a link required for the communication link with a server 12 and a client 14. Then, the session manager 13 notifies a session establishment condition to a client 12, and makes that content of establishment check (Session Set Up Confirm). If a client 14 is connected with a server 12 by session establishment, direct communication will be performed between a client 14 and a



server 12 henceforth, and the image transfer to a client 12 from the server 12 which answered the service request to a server 12 and its demand from the client 14 etc. will be performed.

[0032] Next, with reference to drawing 9 thru/or drawing 12, the example of a multiple address service replace function is explained. For example, the clients C1, C2, and C3 of drawing 1 R> 1 shall carry out the next reservation, respectively.

[0033]

C months [ 1:1 ] 10 21:00 - 23:00 Film A -- Service S1 C months [ 2:1 ] 10 21:10 - 23:10 Film A -- Service S2 C months [ 3:1 ] 10 21:10 - 23:10 Film A -- When the service S3 session manager 1 manages reservation of these services, a managed table as shown in drawing 9 is used as the above-mentioned resource management table 132. The resource which time of day takes the axis of abscissa of drawing 9 R> 9 to, and service takes an axis of ordinate is expressed. Since there are a network resource and a server resource, two or more managed tables are needed for a resource.

[0034] Drawing 10 illustrates the resource utilization situation of a time zone that each service when service is offered as reservation is offered simultaneously. In this condition, it turns out that three services S1, S2, and S3 occupy the separate resource so that clearly from this drawing 10.

[0035] Then, before service is started, the session manager 13 transposes these three services S1, S2, and S3 to one service S4 of a multiple address mold. The replaced service uses a common resource. Drawing 11 is the resource management table after being replaced. As compared with drawing 9, occupancy resources decrease in number, the cost per one client is reduced, and it turns out that it became available in other services about the vacant resource.

[0036] Drawing 12 shows the utilization situation of the resource under service. It turns out that the network resource and the server resource are saved as compared with drawing 10. By replacement of such service, when modification arises by the content of service, before replacing, it is necessary to take comprehension of a client. It is desirable in processing issuing advice of a service permutation to each client, and permuting only the client according to a permutation etc., after it sets up the fluctuation time zone in the phase which obtains comprehension of a client or reserves service or the session manager 13 sets up common service, before replacing since the time of day of service S1 is changed in the above-mentioned example.

[0037] In addition, in the above explanation, although the VOD service system was taken for the example, the reservation function and multiple address service replace function of this operation gestalt are applicable not only to an image call forwarding service but other various information service systems. Moreover, although the case where the session manager 13 also managed a server resource was explained, the session manager 13 may manage only a network resource and a server 12 may manage a server resource here.

---

DESCRIPTION OF DRAWINGS

---

## [Brief Description of the Drawings]

[Drawing 1] The block diagram showing the VOD structure of a system concerning 1 operation gestalt of this invention.

[Drawing 2] Drawing showing the 1st example of the resource management table used by the VOD system of this operation gestalt.

[Drawing 3] Drawing showing the 2nd example of the resource management table used by the VOD system of this operation gestalt.

[Drawing 4] Drawing showing the 1st example of the reservation list used by the VOD system of this operation gestalt.

[Drawing 5] Drawing showing the 2nd example of the reservation list used by the VOD system of this operation gestalt.

[Drawing 6] The flow chart which shows the procedure of the reservation receptionist processing in the VOD system of this operation gestalt.

[Drawing 7] Drawing showing the 1st example of the command sequence performed by the time amount specified by reservation in the VOD system of this operation gestalt.

[Drawing 8] Drawing showing the 2nd example of the command sequence performed by the time amount specified by reservation in the VOD system of this operation gestalt.

[Drawing 9] Drawing showing typically an example of a resource management table when some reservation is set as the VOD system of this operation gestalt.

[Drawing 10] Drawing showing typically the utilization situation of the resource in the VOD system of this operation gestalt.

[Drawing 11] Drawing showing change of the content of the resource management table at the time of using the service replace function in the VOD system of this operation gestalt.

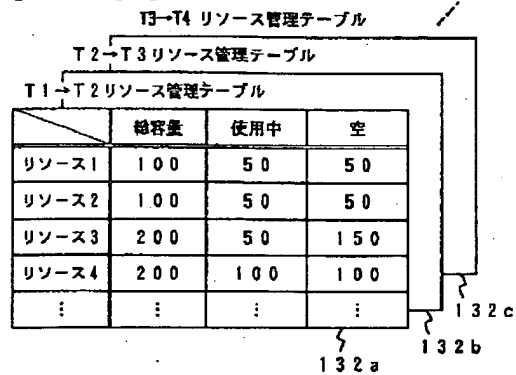
[Drawing 12] Drawing showing typically the utilization situation of the resource at the time of using the service replace function in the VOD system of this operation gestalt.

## [Description of Notations]

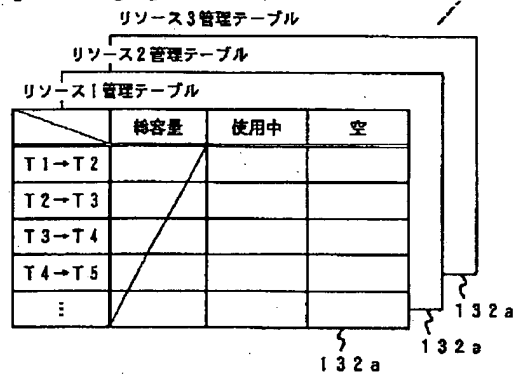
11 [ -- A client, 15 / -- A subscriber, 131 / -- The reservation receptionist processing section 132 / -- The resource management table classified by time zone 133 / -- Reservation list. ] -- A network, 12 -- A server, 13 -- A session manager, 14

## DRAWINGS

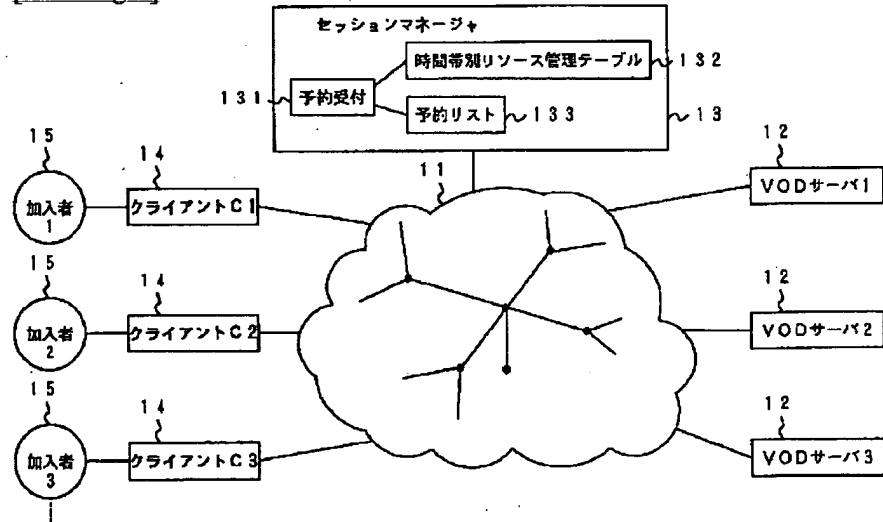
[Drawing 2]



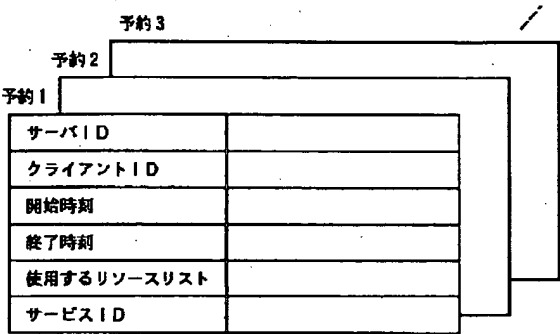
[Drawing 3]



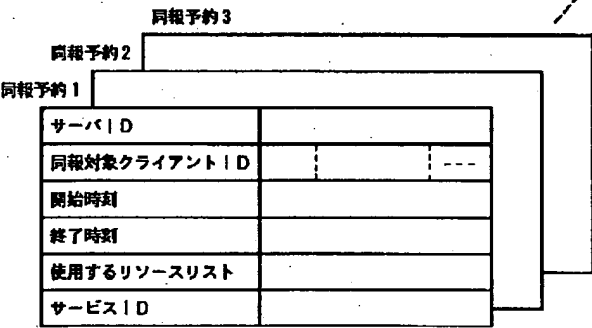
[Drawing 1]



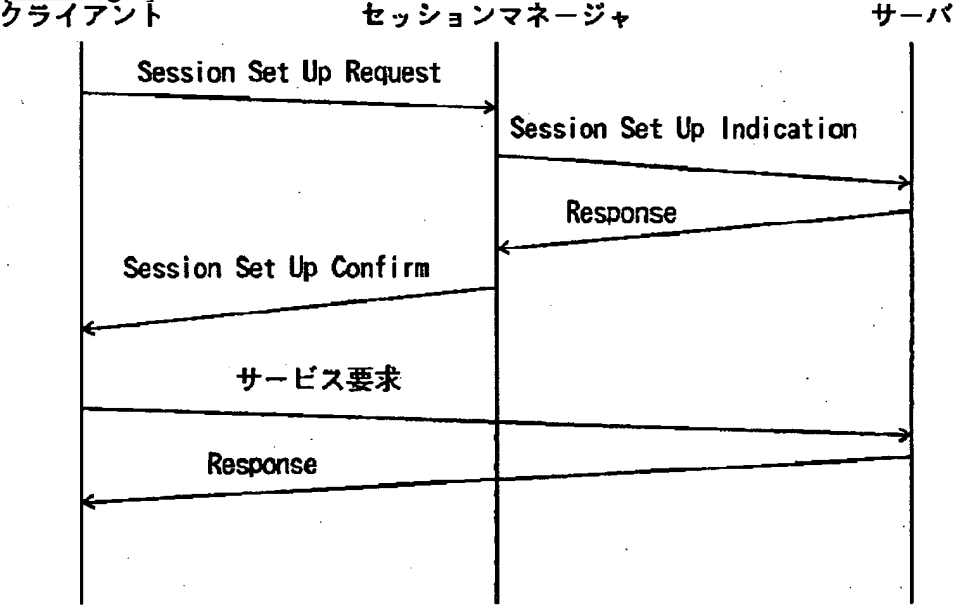
[Drawing 4]



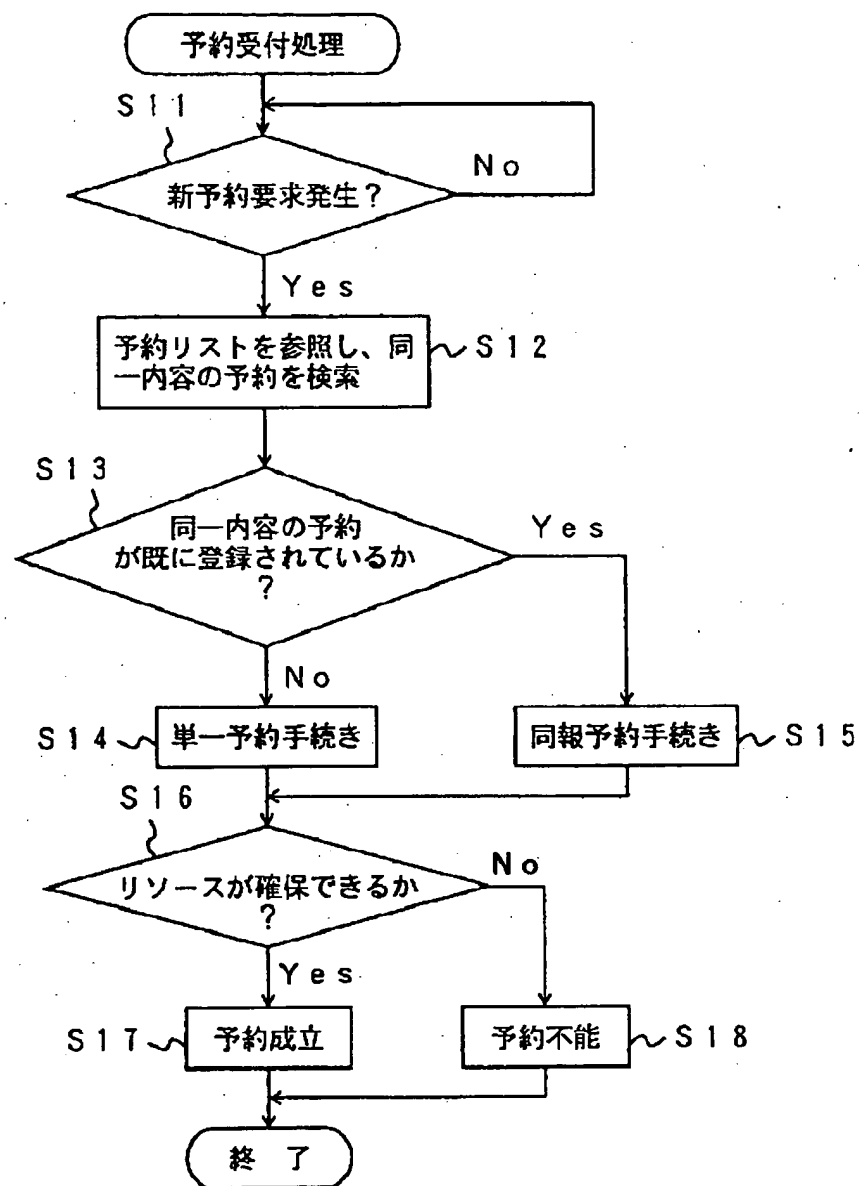
[Drawing 5]



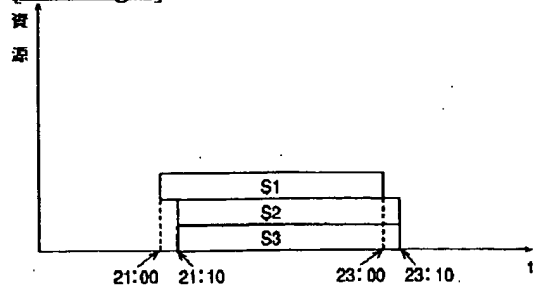
[Drawing 8]



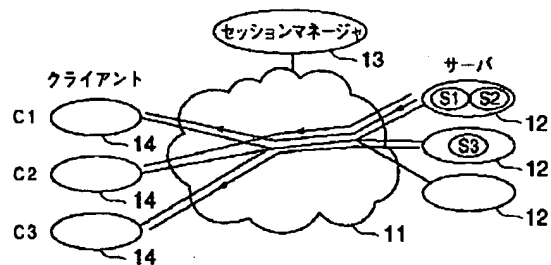
[Drawing 6]



[Drawing 9]



[Drawing 10]

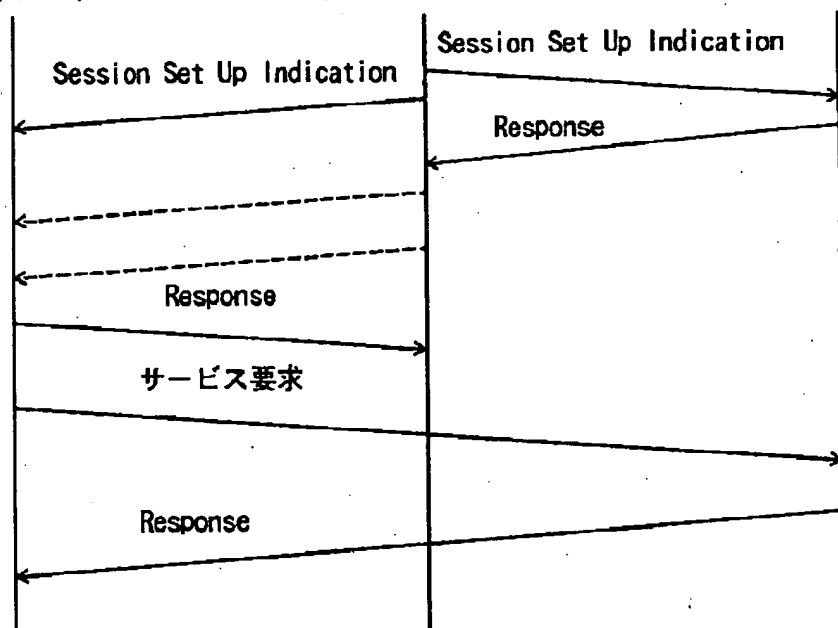


[Drawing 7]

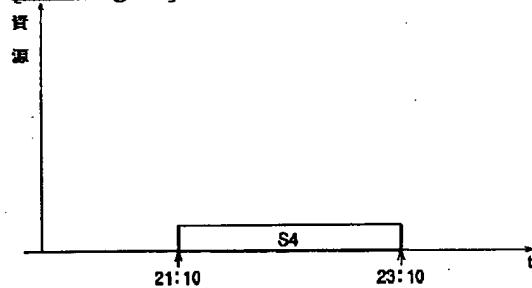
クライアント

セッションマネージャ

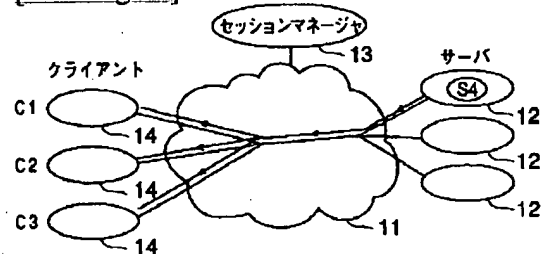
サーバ



[Drawing 11]



[Drawing 12]



(19)日本国特許庁(JP)

(12)公開特許公報(A)

(11)特許出願公開番号

特開平10-78931

(43)公開日 平成10年(1998)3月24日

(51)Int.Cl.	識別記号	庁内整理番号	F I	技術表示箇所
G06F 13/00	357		G06F 13/00	357 Z
	351			351 C
9/46	340		9/46	340 F
H04N 7/173			H04N 7/173	

審査請求 未請求 請求項の数6 O L (全9頁)

(21)出願番号 特願平8-233024

(22)出願日 平成8年(1996)9月3日

(71)出願人 000003078

株式会社東芝

神奈川県川崎市幸区堀川町72番地

(72)発明者 高橋 克己

神奈川県川崎市幸区小向東芝町1番地 株式会社東芝研究開発センター内

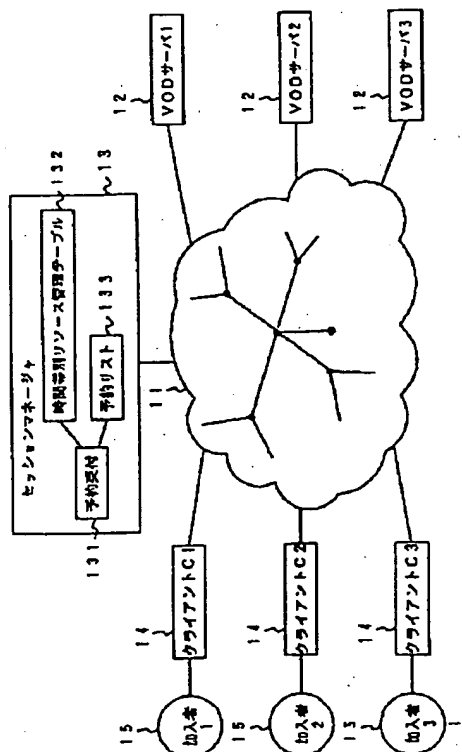
(74)代理人 弁理士 鈴江 武彦 (外6名)

(54)【発明の名称】資源管理方法および情報サービスシステム

(57)【要約】

【課題】ネットワーク混雑時でも加入者に対してサービスを受ける保証を与えることができるVOD/IODシステムの実現を図る。

【解決手段】資源を管理するセッション・マネージャ13には、セッションやサービスを予約する機能が設けられており、加入者は事前にセッションやサービスについての予約を行うことができる。さらに、複数のクライアント14が同一または類似の予約をしている場合には、それらの予約は、セッション・マネージャ13によって、共通の資源を利用する同報型のサービスに置換される。これにより、ネットワーク資源やサーバ資源を有効利用し、他の加入者に対して空いた資源を利用したサービスを提供できるようになる。



## 【特許請求の範囲】

【請求項 1】 ネットワーク接続されたクライアントとサーバとを有し、クライアントから要求された情報を、サーバからクライアントに提供する情報サービスシステムにおける資源管理方法であって、

各クライアントからの接続予約要求を受け付け、その受け付けた接続予約要求に基づいて、ネットワーク資源の利用スケジュールを管理し、

新たな接続予約要求が発行されたとき、その接続予約要求で指定された時間帯における前記ネットワーク資源の利用状況に基づいてその接続予約要求の受け付けが可能であるか否かを判定し、

受け付けた接続予約要求に対してサーバとの接続を保証できるようにしたことを特徴とする資源管理方法。

【請求項 2】 ネットワーク接続されたクライアントとサーバとを有し、クライアントから要求された情報を、サーバからクライアントに提供する情報サービスシステムにおける資源管理方法であって、

各クライアントからのサービス予約要求を受け付け、その受け付けたサービス予約要求に基づいて、サーバ資源の利用スケジュールを管理し、

新たなサービス予約要求が発行されたとき、そのサービス予約要求で指定された時間帯における前記サーバ資源の利用状況に基づいて、そのサービス予約要求の受け付けが可能であるか否かを判定し、

受け付けたサービス予約要求に対してサービスの提供を保証できるようにしたことを特徴とする資源管理方法。

【請求項 3】 ネットワーク接続されたクライアントとサーバとを有し、クライアントから要求された情報を、サーバからクライアントに提供する情報サービスシステムにおける資源管理方法であって、

各クライアントからのサービス予約要求を受け付け、複数のクライアントから予約された同一または類似のサービス要求を、ネットワーク資源およびサーバ資源を共有する 1 つの同報サービスに置換し、

前記予約された複数のサービス要求を同報サービスによって処理できるようにしたことを特徴とする資源管理方法。

【請求項 4】 ネットワーク接続されたクライアントとサーバとを有し、クライアントから要求された情報を、サーバからクライアントに提供する情報サービスシステムにおいて、

各クライアントからの接続予約要求に基づいて、ネットワーク資源の利用スケジュールを管理するネットワーク資源管理手段と、

新たな接続予約要求が発行されたとき、その接続予約要求で指定された時間帯における前記ネットワーク資源の利用状況に基づいてその接続予約要求の受け付けが可能であるか否かを判定する手段とを具備し、

受け付けた接続予約要求に対してはサーバとの接続を保

証できるように構成されていることを特徴とする情報サービスシステム。

【請求項 5】 ネットワーク接続されたクライアントとサーバとを有し、クライアントから要求された情報を、サーバからクライアントに提供する情報サービスシステムにおいて、

各クライアントからのサービス予約要求に基づいて、サーバ資源の利用スケジュールを管理するサーバ資源管理手段と、

新たなサービス予約要求が発行されたとき、そのサービス予約要求で指定された時間帯における前記サーバ資源の利用状況に基づいてそのサービス予約要求の受け付けが可能であるか否かを判定する手段とを具備し、

受け付けたサービス予約要求に対してはサービスの提供を保証できるように構成されていることを特徴とする情報サービスシステム。

【請求項 6】 ネットワーク接続されたクライアントとサーバとを有し、クライアントから要求された情報を、サーバからクライアントに提供する情報サービスシステムにおいて、

各クライアントからのサービス予約要求を受け付けるサービス予約受け付け手段と、

このサービス予約受け付け手段で受け付けられた複数のクライアントからの同一または類似のサービス要求を、ネットワーク資源およびサーバ資源を共有する 1 つの同報サービスに置換する手段とを具備することを特徴とする情報サービスシステム。

## 【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は、資源管理方法および情報サービスシステムに関し、特に VOD（ビデオ・オン・デマンド）／IOD（インフォメーション・オン・デマンド）システムにおけるネットワーク資源やサーバ資源の資源管理方法および同管理方法が適用される情報サービスシステムに関する。

【0002】

【従来の技術】 近年、ビデオ、オーディオのデジタル符号化技術および広帯域ネットワーク技術の発展により、これらを利用したアプリケーションの開発が盛んに行われている。中でも、VOD（ビデオ・オン・デマンド）／IOD（インフォメーション・オン・デマンド）システムは、クライアントからの要求に応じてビデオや他の各種情報をサーバからクライアントに提供するインタラクティブサービスとして注目されている。

【0003】 これら VOD／IOD システムでは、通常、セッションマネージャと称される、ネットワーク等の資源管理機能が利用されている。セッションマネージャの機能は、現在標準化作業が進められている DSM-CC (Digital Storage Media Command & Control: ISO/IEC 1



3818-6) というプロトコルで規格化が進められているが、その基本機能は次の通りである。

【0004】すなわち、セッションマネージャは、ネットワーク資源の利用状況を管理しており、クライアントからのセッション（接続）要求を受け付けると、そのときのネットワーク資源等の空き状況を調べる。空きがあればセッションの設定を行ってクライアントとサーバを接続するが、空きが無い場合にはセッションは設定されずクライアントにエラーが通知される。

【0005】通常、ネットワーク資源は複数のクライアントによって共有されているため、混雑する時間帯においては、セッション設定が行われず、加入者はVOD/IODのサービスを受けることができないという事態が頻繁に発生する。

【0006】また、ネットワーク資源だけでなく、サーバについてもその処理能力は有限であるため、同時に提供可能なサービス数には限界がある。このため、ネットワーク資源だけでなく、サーバ資源（処理能力）に空きが無い場合にも、加入者はVOD/IODのサービスを受けることができなくなる。

【0007】

【発明が解決しようとする課題】上述したように、従来のVOD/IODシステムにおいては、複数の加入者がネットワーク等の資源を共有しているため、混雑する時間帯においては、加入者はサービスを受けることができないことがあった。また、サーバが同時に提供可能なサービス数にも限界があり、サービス要求が多発しているときには、新たなサービス要求が受け付けられなくなるという問題がある。

【0008】本発明はこのような点に鑑みてなされたもので、サーバに対する接続を事前に予約できるようにして、ネットワーク混雑時でも加入者に対してサービスを受ける保証を与えることが可能な資源管理方法および情報サービスシステムを提供することを目的とする。

【0009】また、本発明は、複数の加入者それぞれの予約に対するサービスを同報サービスとしてまとめられるようにし、ネットワーク資源やサーバ資源の有効利用を図ることができる資源管理方法および情報サービスシステムを提供することを目的とする。

【0010】

【課題を解決するための手段】本発明は、ネットワーク接続されたクライアントとサーバとを有し、クライアントから要求された情報を、サーバからクライアントに提供する情報サービスシステムにおける資源管理方法であって、各クライアントからの接続予約要求を受け付け、その受け付けた接続予約要求に基づいて、ネットワーク資源の利用スケジュールを管理し、新たな接続予約要求が発行されたとき、その接続予約要求で指定された時間帯における前記ネットワーク資源の利用状況に基づいてその接続予約要求の受け付けが可能であるかを判定

し、受け付けた接続予約要求に対して、サーバとの通信のための接続を保証できるようにしたことを特徴とする。

【0011】この資源管理方法においては、例えばセッションマネージャなどによって実現される通常のネットワーク資源管理機能に加えて、予約の機能が追加されている。この予約機能は、セッションの設定によるサーバとの接続についての予約を加入者から事前に受け付けるためのものであり、ネットワーク資源の利用状況は、現在の状況だけでなく、各クライアントからの接続予約要求に基づいて、時間をパラメタとしてスケジュール管理される。このようにネットワーク資源の利用スケジュールを管理することにより、新たな接続予約要求がクライアントから発行された時には、その接続予約要求で指定された時間帯におけるネットワーク資源の利用状況を調べることにより、その接続予約要求の受け付けが可能であるかを判別することができる。これにより、加入者は事前に接続の予約を行うことにより、サービスを受ける保証を得ることができる。

【0012】また、ネットワーク資源だけでなく、それに代えて、あるいはそれに加えて、サーバ資源の利用スケジュールを管理することにより、加入者は事前に要求するサービス自体を予約することが可能となる。

【0013】また、本発明は、ネットワーク接続されたクライアントとサーバとを有し、クライアントから要求された情報を、サーバからクライアントに提供する情報サービスシステムにおける資源管理方法であって、各クライアントからのサービス予約要求を受け付け、複数のクライアントから予約された同一または類似のサービス要求を、ネットワーク資源およびサーバ資源を共有する1つの同報サービスに置換し、前記予約された複数のサービス要求を同報サービスによって処理できるようにしたことを特徴とする。

【0014】この資源管理方法によれば、複数の加入者によって同一あるいは類似のサービスが予約されている場合に、それらのサービスが同報型のサービスに置き換えられる。これにより複数の加入者に対するサービスを同一ネットワーク資源およびサーバ資源を利用して行うことが可能となる。したがって、資源の有効利用を図ることができ、またこれによって空きができた資源を別のサービス提供のために活用することができる。

【0015】

【発明の実施の形態】以下、図面を参照して本発明の実施形態を説明する。図1には、本発明の一実施形態に係るVODシステムが示されている。このVODシステムは、加入者15による操作に応じた要求をネットワーク11を介してクライアント14からVODサーバ12に送ることによって、動画などの情報伝送サービスをインタラクティブに提供するものである。

【0016】ネットワーク11は、このVODシステム

において情報伝達を実現するためのものであり、有限の資源（バンド幅等）を有している。各VODサーバ12は、クライアント14によって要求されたサービスを提供するためのものである。個々のサーバ12は、それらの持つ資源（処理能力等）が有限であるために、サービスする能力に限界がある。たとえば同時にサービス可能なクライアント数などが規定されているなどである。

【0017】セッション・マネージャ13は、ネットワーク11の資源、またはネットワーク11と各サーバ12の資源を管理し、クライアント14からのセッション（接続）あるいは、セッションとサービスの要求を受け付ける役目を果たしている。すなわち、セッション・マネージャ13は、ネットワーク11とサーバ12それぞれの資源を管理して、クライアント14からのセッション／サービス開始の要求に応じられる場合には、それらに必要な資源を確保し、クライアント14に対して、セッション／サービス開始の可否の通知を返す。クライアント14は加入者15が直接操作するセットトップボックスなどの端末であり、サービスを受ける機器である。

【0018】本実施形態においては、セッション・マネージャ13は、さらに、予約機能と、その予約機能によって予約された複数のクライアントからのサービス要求を同報サービスに置き換えて処理する同報サービス置換機能を有している。

【0019】（予約機能）予約機能は、セッションの設定によるサーバとの接続やサービスについての予約を加入者から事前に受け付けるためのものである。加入者15がクライアント14を通じてセッションまたはサービスの予約をする場合は、クライアント14とセッション・マネージャ13との会話によって予約が成立する。この会話の途中で、セッション・マネージャ13はサーバ12と会話する場合もある。セッション・マネージャ13が、各クライアント14が指定したセッションまたはサービスを、指定された時間帯に提供できると判断した場合には、予約が成立する。予約が成立すると、予約の詳細な情報がセッション・マネージャ13内に記憶され、クライアント14に対しては予約成立の通知が送られる。

【0020】（同報サービス置換機能）この機能は、複数のクライアント14からの同一または類似のサービスの予約が成立している場合に、それらの予約されたサービスを、条件に応じてある1つの共通のサービスに置換する機能である。共通のサービスとは、放送のような同報型のサービスである。条件としては、例えば、同一のコンテンツ、かつほぼ同一の日時、かつそれらが一定の予約数以上であるというものである。このような同報型サービスに置換することによって、クライアント毎のサービスに占有されるサーバ資源およびネットワークが共通化され資源の節約になり、これにより空きができた資

源を他のサービスに利用することが可能となり、多数の加入者がサービスを受けることができるようになる。

【0021】以上の予約機能および同報サービス置換機能の実現のために、セッション・マネージャ13には、予約受け付け処理部131、時間帯別リソース管理テーブル132、および予約リスト133が設けられている。

【0022】予約受け付け処理部131は、時間帯別リソース管理テーブル132を利用した資源管理と予約リスト133を用いた予約管理を行う。時間帯別リソース管理テーブル132を利用した資源管理では、現在の資源の利用状況だけでなく、将来に亘る資源の利用スケジュールが管理される。この利用スケジュールは、各クライアント14からのセッション予約／サービス予約の状況に基づき、時間をパラメタとして管理される。時間帯別リソース管理テーブル132の一例を図2に示す。

【0023】図2においては、時間帯別リソース管理テーブル132は、時間T1からT2までの時間帯における各ネットワーク資源（リソース1、リソース2、リソース3、リソース4）の利用状況を管理するリソース管理テーブル132a、時間T2からT3までの時間帯における各ネットワーク資源（リソース1、リソース2、リソース3、リソース4）の利用状況を管理するリソース管理テーブル132b、および時間T3からT4までの時間帯における各ネットワーク資源（リソース1、リソース2、リソース3、リソース4）の利用状況を管理するリソース管理テーブル132c、などから構成されている。これら各テーブルにおいては、各ネットワーク資源について使用可能な総容量と、使用中資源量および空き資源量とが管理される。ここで、使用中資源量とは、既に予約が成立しているセッションの設定に要される資源量である。このように時間をパラメタとしてネットワーク資源およびサーバ資源の利用スケジュールを管理することにより、セッション予約／サービス予約で指定された時間帯におけるネットワーク資源およびサーバ資源の空き状況を調べることが可能となり、これによって予約の可否判定を行うことができる。

【0024】また、図3に示すように、各ネットワーク資源（リソース1、リソース2、リソース3、リソース4、…）毎に、時間帯とその時間帯における資源の使用状況（使用中、空き）を管理してもよい。

【0025】図2または図3の構造を持つ資源管理テーブルは、ネットワーク資源だけでなく、サーバ資源についても同様にして構築される。図1の予約リスト133には、予約成立したセッション予約／サービス予約が登録される。この予約リスト133の一例を図4に示す。図4に示されているように、予約リスト133においては、各予約毎に、使用するサーバID、クライアントID、セッションまたはサービスの開始時刻、終了時刻、予約内容の実施に必要なリソース名リスト、予約された

サービスの種類を特定するためのサービスIDなどが登録される。図4に登録された予約リスト133に登録された予約の内、サービス開始時刻および終了時刻、およびサービス内容が同一または類似の予約については、図5の同報用予約リストに再登録される。この同報用予約リストには、同報サービス毎に、使用するサーバID、同報サービスを受ける複数のクライアントID、セッションおよびサービスの開始時刻、終了時刻、予約内容の実施に必要なリソース名リスト、予約されたサービスの種類を特定するためのサービスIDなどが登録される。

【0026】次に、図6のフローチャートを参照して、セッション・マネージャ13の予約受け付け処理部131による予約受け付け処理手順を説明する。クライアント14から新たな予約要求が発生すると(ステップS11)、予約受け付け処理部131は、予約リスト133を参照して、時間、コンテンツなどについて同一または類似した内容の予約が既に登録されているか否かを調べる(ステップS12、S13)。同一または類似した内容の予約が登録されてない場合には新たな予約要求は単一処理すべき予約として扱われ、また同一または類似した内容の予約が既に登録されている場合には新たな予約要求は他の要求と一緒に同報処理すべき予約として扱われる(ステップS14、S15)。

【0027】この後、単一処理すべき予約、または同報処理すべき予約で指定された時間帯における資源の空き状態が時間帯別リソース管理テーブル132を参照することによって調べられ、セッション設定・サービス提供に必要なリソースを確保できるか否かが判断される(ステップS16)。

【0028】セッション設定・サービス提供に必要なリソースを確保できる場合には、予約リスト133にその予約が登録されるとともに、該当するクライアント14に対して予約成立が通知され(ステップS17)、またリソースを確保できない場合には予約の不成立が該当するクライアント14に対して通知される(ステップS18)。

【0029】次に、予約されたセッションまたはサービスの開始時刻に行われるコマンドシーケンスについて説明する。まず、図7を参照して、セッション・マネージャ13によってコマンドシーケンスが起動される場合に

ついて説明する。

【0030】セッション・マネージャ13は、予約されたセッションまたはサービスの開始時刻になると、予約内容に基づいて該当するサーバ12およびクライアント14に対してそれぞれセッション設立指示(Session Set Up Indication)を発行し、サーバ12とクライアント14との通信に必要なリンクをその間に設定する。セッション設立指示に対する応答(Response)が返送されないときには、セッション設立指示の発行処理が何度か再試行される。セッション設立によってサーバ12とクライアント14が接続されると、以降は、クライアント14とサーバ12間で直接通信が行われ、クライアント14からサーバ12に対するサービス要求や、その要求に回答したサーバ12からクライアント12への画像転送などが行われる。

【0031】次に、図8を参照して、クライアントからコマンドシーケンスが起動される場合の動作について説明する。クライアント14は、予約されたセッションまたはサービスの開始時刻になると、セッション・マネージャ13に対してセッション設立要求(Session Set Up Request)を発行する。セッション・マネージャ13は、予約内容に従ってサーバ12に対してセッション設立指示(Session Set Up Indication)を発行し、サーバ12とクライアント14との通信に必要なリンクを設定する。この後、セッション・マネージャ13は、クライアント12に対してセッション設立状態を通知してその設立内容を確認させる(Session Set Up Confirm)。セッション設立によってサーバ12とクライアント14が接続されると、以降は、クライアント14とサーバ12間で直接通信が行われ、クライアント14からサーバ12に対するサービス要求や、その要求に回答したサーバ12からクライアント12への画像転送などが行われる。

【0032】次に、図9乃至図12を参照して、同報サービス置換機能の具体例について説明する。例えば、図1のクライアントC1、C2、C3がそれぞれ次の予約をしているものとする。

【0033】

C1: 1月10日 21:00~23:00 映画A ...サービスS1  
C2: 1月10日 21:10~23:10 映画A ...サービスS2  
C3: 1月10日 21:10~23:10 映画A ...サービスS3

セッション・マネージャ1がこれらのサービスの予約を管理する場合には、図9に示すような管理テーブルが前述のリソース管理テーブル132として用いられる。図9の横軸は時刻、縦軸はサービスに要する資源を表している。資源には、ネットワーク資源やサーバ資源があるため、複数の管理テーブルが必要となる。

た場合、各サービスが同時に提供されている時間帯の資源利用状況を図示したものである。この図10から明らかなように、この状態では3つのサービスS1、S2、S3は別々の資源を占有していることがわかる。

【0035】そこで、サービスが開始される前にセッション・マネージャ13が、これら3つのサービスS1、

る。置き換えられたサービスは、共通の資源を利用する。図 11 は置き換えられた後のリソース管理テーブルである。図 9 に比較して、占有資源が減り、1 クライアント当たりのコストが削減され、空いた資源を他のサービスに利用可能になったことがわかる。

【0036】図 12 は、サービス中の資源の利用状況を示したものである。図 10 に比較してネットワーク資源、サーバ資源ともに節約されていることがわかる。こうしたサービスの置き換えによって、サービスの内容に変更が生じる場合には、置き換える前に、クライアントの了解をとっておく必要がある。上記の例ではサービス S1 の時刻が変更になっているため、置き換える前にクライアントの了解を得るか、サービスを予約する段階で変動時間帯を設定しておくか、あるいは、セッション・マネージャ 13 が共通のサービスを設定した後、各クライアントに対して、サービス置換の案内を出し、置換に応じたクライアントのみを置換するようにするなどの処理を行うことが好ましい。

【0037】なお、以上の説明では、VOD サービスシステムを例にとったが、この実施形態の予約機能および同報サービス置換機能は、画像転送サービスのみならず、他の各種情報サービスシステムに対して適用することができる。また、ここでは、セッション・マネージャ 13 がサーバ資源も管理する場合を説明したが、セッション・マネージャ 13 は、ネットワーク資源のみを管理し、サーバ 12 がサーバ資源を管理してもよい。

【0038】

【発明の効果】以上説明したように、本発明によれば、セッション・マネージャに予約の機能を持たせたことにより、加入者が事前にサービスを受ける保証を得ることができる。また、同一または類似のサービスを同報型のサービスに置き換えることにより、1 クライアント当たりのコストが削減されるとともに、これによって空いた資源を他に利用可能になり、多数の加入者がサービスを受けることができるようになる。

【図面の簡単な説明】

【図 1】本発明の一実施形態に係る VOD システムの構成を示すブロック図。

【図 2】同実施形態の VOD システムで使用されるリソース管理テーブルの第 1 の例を示す図。

【図 3】同実施形態の VOD システムで使用されるリソース管理テーブルの第 2 の例を示す図。

【図 4】同実施形態の VOD システムで使用される予約リストの第 1 の例を示す図。

【図 5】同実施形態の VOD システムで使用される予約リストの第 2 の例を示す図。

【図 6】同実施形態の VOD システムにおける予約受け付け処理の手順を示すフローチャート。

【図 7】同実施形態の VOD システムにおいて予約で指定された時間に行われるコマンドシーケンスの第 1 の例を示す図。

【図 8】同実施形態の VOD システムにおいて予約で指定された時間に行われるコマンドシーケンスの第 2 の例を示す図。

【図 9】同実施形態の VOD システムにいくつかの予約が設定された場合のリソース管理テーブルの一例を模式的に示す図。

【図 10】同実施形態の VOD システムにおける資源の利用状況を模式的に示す図。

【図 11】同実施形態の VOD システムにおけるサービス置換機能を利用した場合のリソース管理テーブルの内容の変化を示す図。

【図 12】同実施形態の VOD システムにおけるサービス置換機能を利用した場合の資源の利用状況を模式的に示す図。

【符号の説明】

11…ネットワーク、12…サーバ、13…セッション・マネージャ、14…クライアント、15…加入者、131…予約受け付け処理部、132…時間帯別リソース管理テーブル、133…予約リスト。

【図 2】

T3→T4 リソース管理テーブル

T2→T3 リソース管理テーブル

T1→T2 リソース管理テーブル

	総容量	使用中	空
リソース1	100	50	50
リソース2	100	50	50
リソース3	200	50	150
リソース4	200	100	100
⋮	⋮	⋮	⋮

132c

132a 132b

【図 3】

リソース3管理テーブル

リソース2管理テーブル

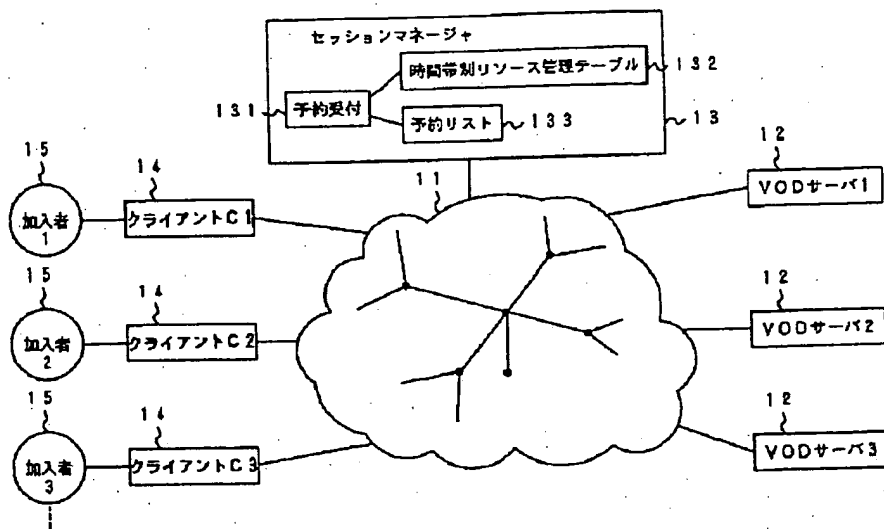
リソース1管理テーブル

	総容量	使用中	空
T1→T2			
T2→T3			
T3→T4			
T4→T5			
⋮			

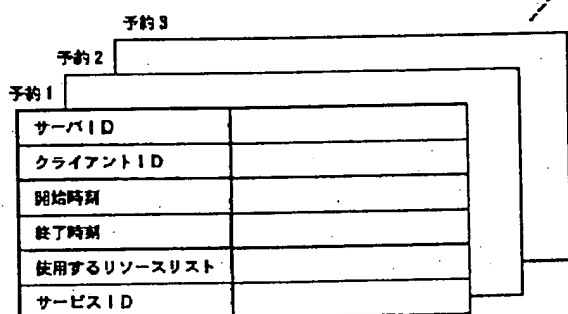
132a

132a 132b

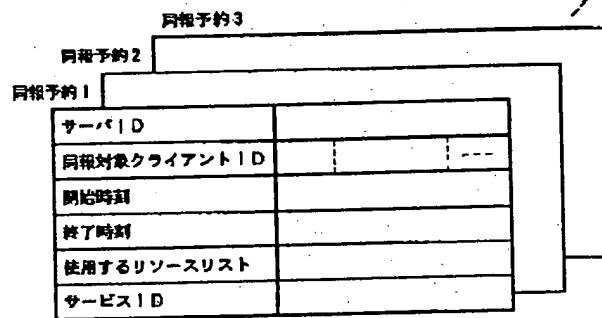
【図1】



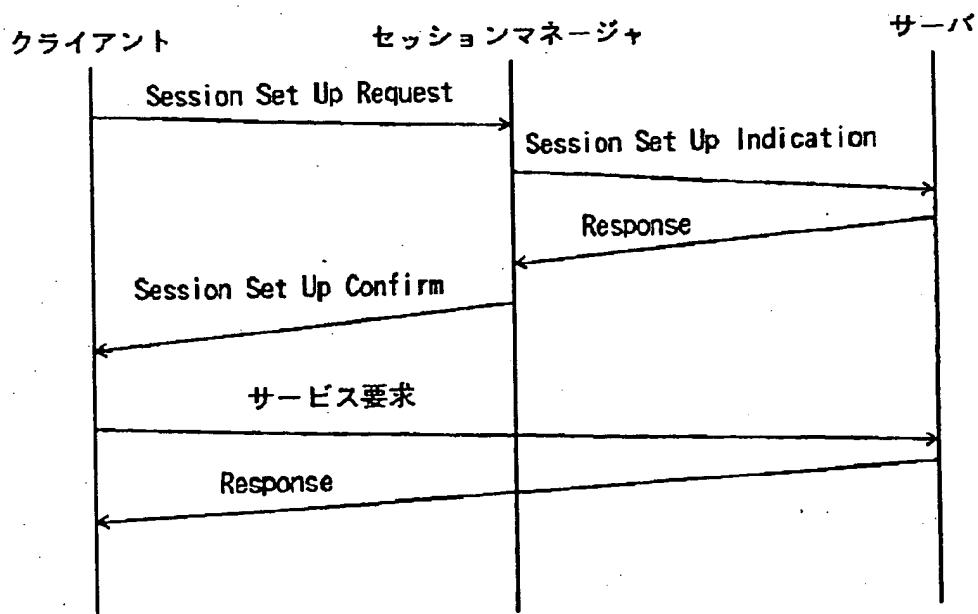
【図4】



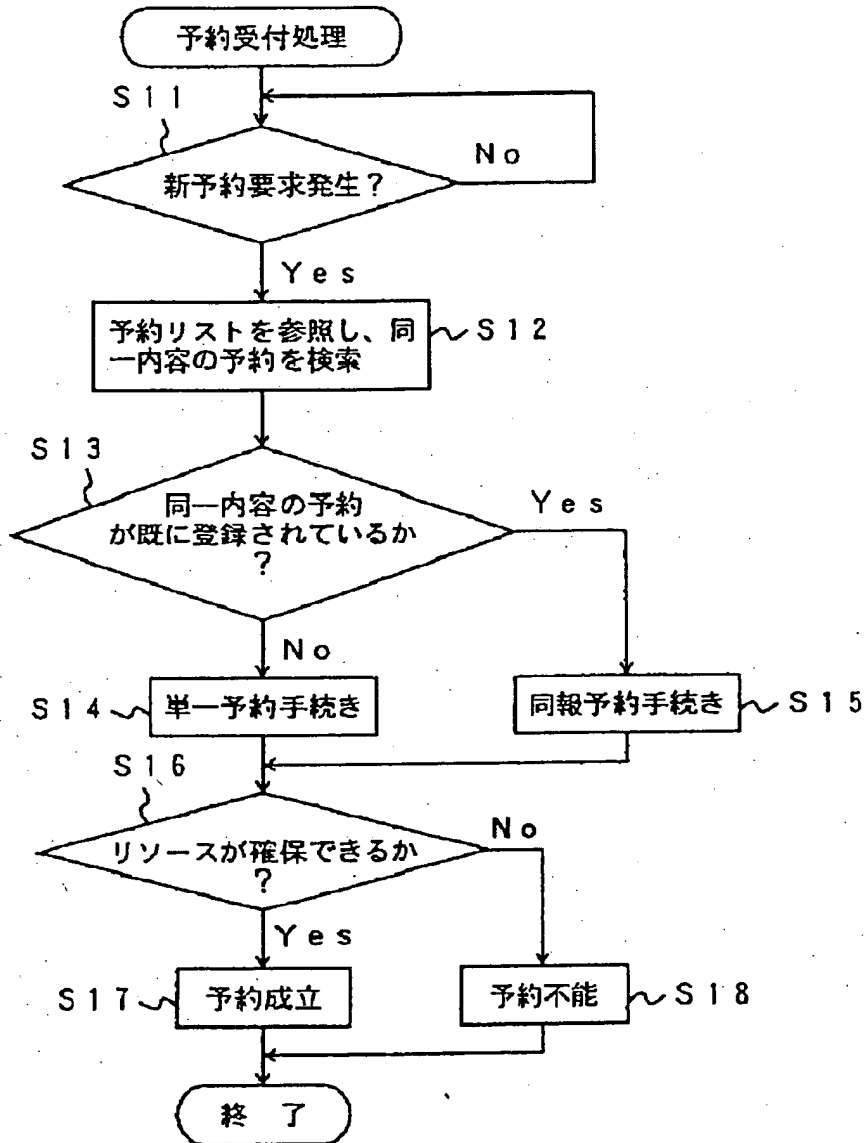
【図5】



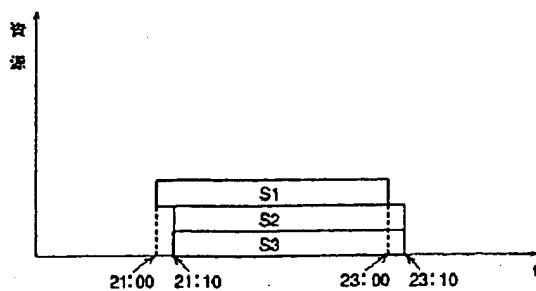
【図8】



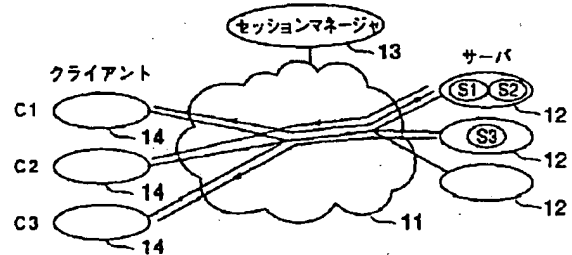
【図 6】



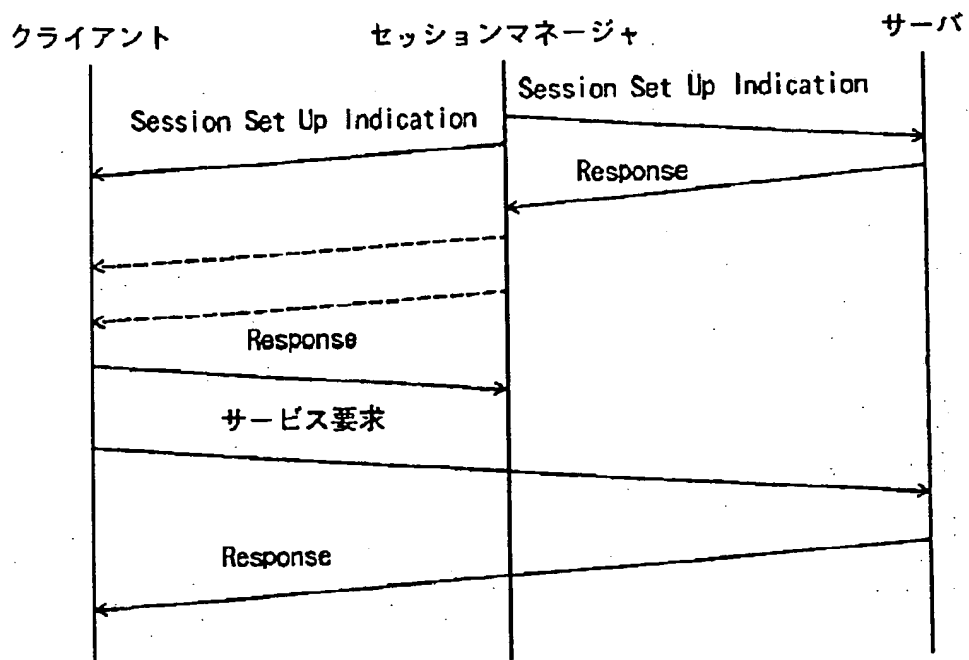
【図 9】



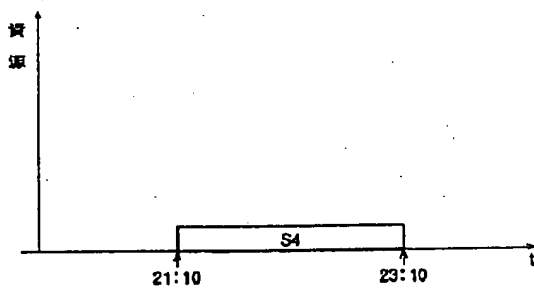
【図 10】



【 図 7 】



【 図 1 1 】



【 図 1 2 】

